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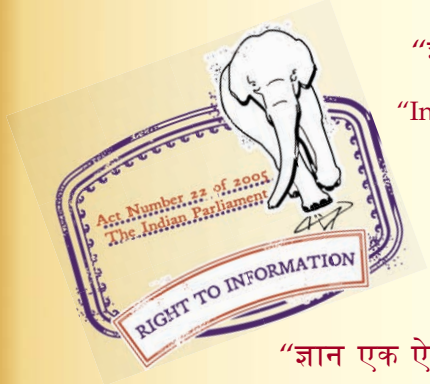
IS 11785 (1986): Captan (Wettable Powder) WP [FAD 1: Pesticides and Pesticides Residue Analysis]



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SPECIFICATION FOR CAPTAN (WETTABLE POWDER) WP

UDC 632·951 CAP

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3

February 1987

Indian Standard

SPECIFICATION FOR CAPTAN (WETTABLE POWDER) WP

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AMENDMENT NO. 1 JULY 1994
TO
IS 11785 : 1986 SPECIFICATION FOR **CAPTAN** (WETTABLE POWDER) WP

(Page 4, Table 1)

a) *Sl* No (ii), *col* 2
b) *Sl* No (iii), *col* 2 } — Delete the words 'after accelerated storage'

(Page 6, ***clause*** 4 1) — Substitute the following for **the** existing.

'When freshly manufactured material in bulk quantity is offered for inspection, representative samples of the material shall be drawn and tested as prescribed in IS 10627 : 1983 within 90 days of its manufacture. When the material is offered for inspection after 90 days of its manufacture, sampling shall be done as prescribed in IS 10627 : 1983 However, the criteria for conformity of the material when tested, shall be the limits of tolerances, as applicable over the declared nominal value and given under clause 2 3 1 of the standard '

(FAD 1)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 DECEMBER 2006
TO
IS 11785 : 1986 SPECIFICATION FOR CAPTAN (WETTABLE POWDER) WP

(*Page* 4, *clause* 2.2) — Substitute 'Captan, technical employed in the manufacture of the material, shall conform to IS 14251 : 1995*' *for* 'Captan, employed in the manufacture of this product shall contain not less than 90 percent captan in it'.

(*Page* 4) — Insert the following footnote at the end of page:

'*Captan, technical — Specification'

(FAD 1)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 JANUARY 2011
TO
IS 11785 : 1986 SPECIFICATION FOR CAPTAN (WETTABLE POWDER) WP

(*Page* 6, *Appendix* A, *clause* **A-1**) — Add the following new clause before **A-1**:

'**A-0 GENERAL**

A-0.1 Either of the two methods, namely, Titration Method (*see* **A-1**) or GC Method (*see* **A-2**) shall be used for estimating captan content. However, GC Method will be the referee method in case of dispute.'

(*Page* 8, *clause* **A-1.3**) — Add the following new clause after **A-1.3**:

'**A-2 GAS CHROMATOGRAPHY METHOD**

A-2.1 Principle

The captan, technical is determined by gas chromatography using internal standard technique.

A-2.2 Apparatus

A-2.2.1 Gas chromatograph (GLC) equipped with FID with facilities for on column injection and coupled to a printer-plotter-cum-integrator is used for this determination. The suggested operative parameters are as follows, but can be changed, if necessary, provided standardization is done:

Column	:	Stainless steel, length = 1 m, OD = 1/8 inch, packed with 5 percent SE-30 on Chromosorb W (HP)
Temperature	:	Column oven — 190ºC Detector — 260ºC Injector — 250ºC
Carrier Gas	:	Nitrogen — 30 ml/min Hydrogen — 30 ml/min Air — 315 ml/min
Attenuation	:	16
Range	:	10
Retention time (Guide values)	:	Captan — 4.0 min (Approx) Di-*n*-butyl phthalate — 3.0 min (Approx)

A typical GC chromatogram of captan with internal standard solution is given in Fig. 1.

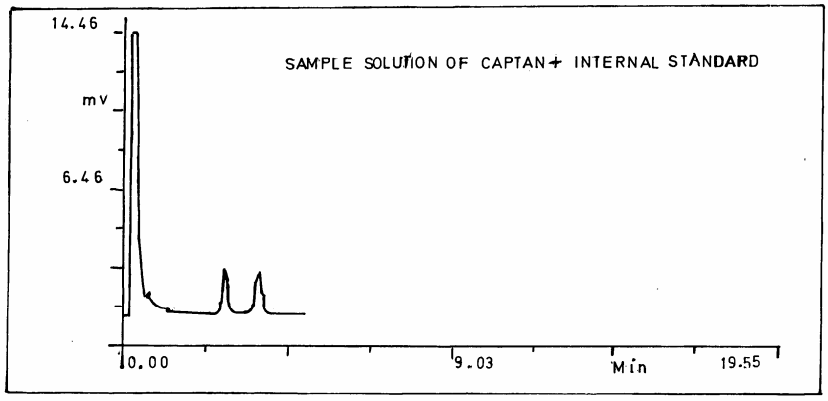

FIG. 1 A TYPICAL CHROMATOGRAM

A-2.2.2 *Injection Volume*, 2 µl.

A-2.2.3 *Standard Glassware*

A-2.2.4 *Microlitre Syringe*, 5/10 µl capacity.

A-2.3 Reagents

A-2.3.1 *Acetone*, AR grade or equivalent.

A-2.3.2 *Internal Standard*, Di-*n*-butyl phthalate (DBP) AR grade or equivalent.

A-2.3.3 *Captan Reference Standard*, of known purity.

A-2.4 Procedure

A-2.4.1 *Preparation of Internal Standard Solution*

Weigh out accurately 0.6 g of Di-*n*-butyl phthalate into a 100-ml volumetric flask. Dissolve in acetone and make up the volume up to the mark with acetone.

A-2.4.2 *Preparation of Standard Solution*

Weigh out accurately about 0.1 g of captan reference standard of known purity into a 50-ml volumetric flask. Add 20-ml of acetone. Stopper the flask and dissolve using sonicator. Add 10-ml of internal standard solution and make up the volume up to 50-ml mark with acetone. Shake well to homogenize.

A-2.4.3 *Preparation of Sample Solution*

Weigh out accurately a sample quantity so as to contain 0.1 g of captan into a 50-ml volumetric flask. Add 20-ml of acetone. Stopper the flask and dissolve using sonicator. Add 10-ml of internal standard solution and mix. Add another 20-ml of acetone. Filter and collect the clear filtrate in a stopper test tube.

A-2.5 Estimation

A-2.5.1 Inject Standard Captan Solution (**A-2.4.2**) and Sample Solution (**A-2.4.3**). Measure the areas of captan and internal standard peaks in each case and compute the captan content.

A-2.6 Calculation

$$\text{Captan content, percent by mass} = \frac{R_2}{R_1} \times \frac{M_1}{M_2} \times P$$

where

R_1 = ratio of captan peak area to internal standard peak area of the standard,
R_2 = ratio of captan peak area to internal standard peak area of the sample (whose purity has to be determined),
M_1 = mass in g of captan in standard solution,
M_2 = mass in g of sample taken for test, and
P = percent purity of captan reference standard.

(FAD 1)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR CAPTAN (WETTABLE POWDER) WP

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 14 August 1986, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Captan WP is widely used as fungicide.

0.3 Captan WP is generally manufactured to contain 50 percent (*m/m*) of captan.

0.4 In the preparation of this standard, due consideration has been given to the provisions of the *Insecticides Act, 1968* and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these rules, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for captan WP.

2. REQUIREMENTS

2.1 Description — The material shall be in the form of a fine homogeneous powder, white to off-white in colour, and shall wet readily on mixing with water, providing a suspension suitable for use as a spray. The material shall be free from visible extraneous matter and hard aggregates.

*Rules for rounding off numerical values (*revised*).

2.2 Captan, employed in the manufacture of this product shall contain not less than 90 percent captan in it.

2.3 The material shall also comply with the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR CAPTAN WP

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Appendix of This Standard	Cl No of IS 6940-1982*
(1)	(2)	(3)	(4)	(5)
i)	Captan content, percent by mass	Nominal value as declared on the container (*see* **2.3.1**)	A	—
ii)	Sieving requirement, material passing through 75-microns IS Sieve†, after accelerated storage, percent by mass, *Min*	97 0	—	11 1
iii)	Suspensibility, after accelerated storage, percent by mass, *Min*	70	—	11 2‡
iv)	Wettability in seconds, *Max*	120	—	11.4
v)	Acidity (as H_2SO_4), percent by mass, *Max*	0·1	—	11.3
	or			
	Alkalinity (as NaOH), percent by mass, *Max*	0 1	—	11.3

*Methods of test for pesticides and their formulations (*first revision*)

†IS:460 (Part 1)-1978 Specification for test sieves: Part 1 Wire cloth test sieve (*second revision*).

BS Test Sieve 200, ASTM Test Sieve 200, Tyler Test Sieve 200 have their apertures within the limits specified for the above IS test sieve, and may, therefore, be used as 75-microns IS Sieve.

‡The accelerated treatment shall not be given to the sample before testing, if the sample/consignment sample has already crossed half of its shelf life on the day of testing. Shelf life shall be taken as the period between its date of manufacture and expiry date as declared on the container by the manufacturer.

2.3.1 *Captan Content* — When determined by the method prescribed in Appendix A the observed captan content, percent (*m/m*) of any of the samples shall not differ from the declared nominal value by more than the tolerance limits indicated below:

Nominal Value, Percent	*Tolerance Limit, Percent*	
Up to 9	+ 10 − 5	of the nominal value
Above 9 and below 50	± 5	
50 and above	+ 5 − 3	

2.3.1.1 The actual value of captan content shall be calculated to the second decimal place and then rounded off to the first decimal place before applying the tolerance as stipulated in **2.3.1.**

2.3.1.2 The average content of all the samples taken shall not be lower than the declared nominal content.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in clean and dry containers made of mild steel or tin plate or fibreboard lined with polyethylene of thickness not less than 0·062 mm. Retail pack up to 500 g shall be in HDPE bottles or composite containers lined with polyethylene liner of thickness not less than 0·062 mm. The containers shall also comply with the general requirements as stipulated in **2** of IS : 8190 (Part 1)-1980*.

3.2 Marking — The container shall bear legibly and indelibly the following information in addition to other information as is necessary under the *Insecticides Act* and Rules:

a) Name of the material;

b) Name of the manufacturer;

c) Date of manufacture and date of expiry;

d) Batch number;

e) Net mass of contents;

f) Captan content, percent (*m/m*); and

g) The minimum cautionary notice as worded in *Insecticides Act* and Rules.

*Requirements for packing of pesticides: Part 1 Solid pesticides (*first revision*).

3.2.1 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in IS : 10627-1983*.

5. TESTS

5.1 Tests shall be carried out by the methods referred to *in col* 4 *and* 5 *of* Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977†) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

APPENDIX A

[*Clause* 2.3.1; *and Table* 1, *Item* (i)]

DETERMINATION OF CAPTAN CONTENT

A-1. TITRATION METHOD

A-1.0 Principle — Captan is hydrolyzed with dilute sodium hydroxide and the inorganic chlorine determined by Volhard method.

*Methods for sampling of pesticides formulations.

†Specification for water for general laboratory use (*second revision*).

A-1.1 Reagents

A-1.1.1 *Acetone*

A-1.1.2 *Methanol*

A-1.1.3 *Hydrogen Peroxide* — 30 percent.

A-1.1.4 *Sodium Hydroxide Solution* — 0·3 N.

A-1.1.5 *Silver Nitrate Solution* — 0·1 N.

A-1.1.6 *Potassium Thiocyanate* — 0·1 N.

A-1.1.7 *Nitric Acid* — 1·1 (*v/v*).

A-1.1.8 *Ferric Sulphate*

A-1.1.9 *Ferric Alum*

A-1.1.10 *Nitrobenzene*

A-1.2 Procedure

A-1.2.1 Weigh accurately a quantity of material containing 1 g active ingredient material and transfer to a 250-ml volumetric flask. Add 125 ml acetone and agitate for 30 seconds every three minutes for 15 minutes to dissolve soluble material. Add methanol up to mark and mix thoroughly. Let insoluble material settle. Adjust the volume again, if required.

A-1.2.2 Transfer 100-ml aliquot to a suitable refluxing flask within *45 miuutes* of addition of methanol as given above. Add 50 ml of 0·3 N sodium hydroxide and reflux for 1 h in alkaline medium. The digestion mixture should be alkaline when the digestion is finished. A drop or two of phenolphthalein indicator solution may be added at the beginning and if necessary more sodium hydroxide solution should be added to keep the digestion mixture alkaline. After refluxing, add cautiously 5 ml of hydrogen peroxide. Boil for another 10 minutes. Ensure that volume do not go down below 80 ml. Add more hydrogen peroxide and boil to bring the solution practically colourless. Cool, add 10 ml nitric acid, 1 g ferric sulphate and 1 ml saturated ferric nitrate (or ferric alum) solution. Add from a burette 40 ml of 0·1 N silver nitrate. Add 5 ml nitrobenzene, shake and titrate with potassium thiocyanate.

A-1.2.3 Transfer another 100-ml aliquot to another 500-ml Erlenmeyer flask (*see* **A-1.2.1**). Add 40 ml water, 10 ml nitric acid and 1 g of ferric sulphate. Carry out titration under identical conditions as given in **A-1.2.2** but without refluxing. Complete the titration within two minutes.

A-1.3 Calculation

$$\text{Captan content, percent by mass} = \frac{(V_2 - V_1) \times 0{\cdot}100\,2 \times 2{\cdot}5 \times N \times 100}{M}$$

where

V_2 = volume, in ml, of potassium thiocyanate required for blank;

V_1 = volume, in ml, of potassium thiocyanate required for sample;

N = normality of potassium thiocyanate; and

M = mass, in g, of the sample taken for the test.

(*Continued from page* 2)

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Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg. m/s^2
Energy	joule	J	1 J = 1 N m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
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